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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/186,973	11/05/98	HEINEN	K 1000-2035

EXAMINER	
CRUZ, L.	
ART UNIT	**PAPER NUMBER**
2815	

DATE MAILED: 02/22/01

023494 MMC2/0222
TEXAS INSTRUMENTS INCORPORATED
P O BOX 655474, M/S 3999
DALLAS TX 75265

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trad marks

Office Action Summary	Application No.	Applicant(s)	
	09/186,973	HEINEN ET AL.	
	Examiner	Art Unit	
	Lourdes C. Cruz	2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 December 2000* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) *14-18* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claims *14-18* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

15) ☒ Notice of References Cited (PTO-892)
16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
18) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
19) ☐ Notice of Informal Patent Application (PTO-152)
20) ☐ Other: .

DETAILED ACTION

This Office Action is in response to an Amendment filed December 15, 2000.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arima et al. in view of Khandros et al. (5346861).

Arima et al. teach:

A semiconductor assembly comprising a semiconductor wafer having a plurality of integrated circuits (6), each circuit having a plurality of metal contact pads as electrical entry and exit ports (10,8,50); and electrically conductive array, substantially paralell to the surface of said wafer, comprising a multitude of coupling members (12) is electrically in contact with one circuit contact pad, respectively, while remaining insulated from its adjacent coupling member;

An interposer (3) of electrically insulating material (Col. 7, lines 1+) having electrically conductive paths (7,5) extending through said interposer from one surface to the opposite surface, forming electrical entry and exit ports on said insulating interposer; said interposer positioned substantially parallel to the wafer surface and having one of its surfaces attached to said planar array, thereby electrically connecting said ports to at least some of said coupling members;

The difference between Arima and the claimed invention is the failure to disclose undivided integrated circuits joined together by semiconductor crystal. However, Khandros teaches wafer comprising a plurality of integrated circuits joined together by semiconductor crystal. It would have been obvious to utilize a semiconductor wafer in order to facilitate and speed up production of the device.

Although Arima fails to disclose a planar array of solder balls attached to said exit ports of said interposer failure to specifically describe the method used for attaching either one of interposers 2 or 3 to each other or to other means is considered to suggest attaching methods well known among those in the semiconductor art and having ordinary skill in the art. Therefore, to form a planarized array of solder ball attached to said exit ports would have been obvious to one having ordinary skill in the art at the time the invention was made, because solder ball arrays are conventionally used in the semiconductor art as suggested by Arima et al.

Regarding claim 2, Arima et al. teach a semiconductor wafer comprising a material used in electronic device production.

Regarding claim 3, Arima et al. teach the device of claim 2, wherein said metal pads comprise Copper (Col. 7, line 4).

Regarding claim 4, Arima et al. teach the device of claim 3 wherein said contact pads (50) are chromium (Col. 6, line 66).

Regarding claim 5, Arima et al. teach the device of claim 3, wherein the contact pads (8) are gold (See col. 10, line 49).

Regarding claim 6, Arima et al. teach coupling members comprising solder balls (12).

Regarding claim 7, Arima et al. teach the semiconductor device of claim 6, wherein the space between said discrete solder balls is ambient or filled with epoxy or other insulating material.

Regarding claim 8, Arima et al. teach the semiconductor device of claim 1, wherein said coupling members comprise a multitude of electrically conductive fibers extending through an electrically nonconductive layer from one surface to the opposite surface, while remaining insulated from adjacent fibers (through 10, see Col. 6, line 43).

Regarding claim 9, Arima et al. teach the device of claim 1, wherein said electrically insulating interposer is mechanically elastic.

Regarding claim 10, Arima et al. teach the device of claim 9, wherein said mechanically elastic material (3) comprises polyimide (See Col. 7, lines 1+).

Regarding claim 11, Arima et al. teach an inteposer (2) comprising a ceramic material (See col. 8, lines 52+).

Regarding claim 12, see that Arima et al. teach polyimide film (3) as explained above, and conductive paths (7) made of Copper, and that (2) is ceramic as explained above, and paths (5) comprise tungsten (See Col. 10, lines 28+).

Regarding claim 13, Arima et al. teach entry and exit ports comprising copper (50) overlaid by gold (8).

R spons to Arguments

Applicant's arguments with respect to the previous rejection have been considered but are moot in view of the new ground(s) of rejection. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. See MPEP § 706.07(a).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Hoang, Beilin et al., Nguyen, Fujita, Arima et al., Andros et at, Kuroda, Gregor et al., Shih et al., and Lopergolo et al. disclose interposer structures with feed-through conductors. Swamy et al, Hirano et al., Kozono, Dohya, Matsumoto et al., and Dougherty et al. disclose ceramic or resin interposers with feed-trough holes

and BGAs. Tokuda et al., and Kim disclose semiconductor package arrangements including interposers.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lourdes C. Cruz whose telephone number is 707-306-5691. The examiner can normally be reached on M-F 8:00- 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on 703-308-1690. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Lourdes C. Cruz
Examiner
Art Unit 2815

Lourdes Cruz
February 20, 2001

EDDIE C. LEE
PRIMARY EXAMINER